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COLUMBELLIDÆ FROM WESTERN MEXICO *

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The present paper follows the plan of preceding ones published in the Proceedings of the Academy. There are listed all of the species of the family Columbellidæ which were obtained by the expedition to the Gulf of California in 1921, and those to various islands and points on the Peninsula in 1922 and 1925.¹ References are given to original descriptions and, when possible, to figures. Except in cases where the original records have been verified, synonyms have not been quoted.

The family Columbellidæ is represented on the west coast of North America by about 100 species. In so large a number it is

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¹ For general accounts of these expeditions see:

Slevin, J. R. Proc. Calif. Acad. Sci., ser. 4, vol. 12, no. 6, 1923, pp. 55-72.—Hanna, G. D. Proc. Calif. Acad. Sci., ser. 4, vol. 14, no. 12, 1925, pp. 217-275, pls. 15-19.—Hanna, G. D. Proc. Calif. Acad. Sci., ser. 4, vol. 15, no. 1, 1926, pp. 1-113, pls. 1-10.

difficult to find combinations of characters whereby sharp distinctions can be made between genera. However, most of the species fall readily into the recognized groups. A key to the genera which we now accept as inhabitants of western waters is presented below.

Key to genera of west American Columbelloidea

- 1 Aperture with both anterior and posterior canal *Bifurcium*
- 1 Aperture with posterior canal only
 - 2 Shell coniform, aperture long and narrow *Parametaria*
 - 2 Shell strombiform to ovate, outer lip dentate in the adult
 - 3 Shell smooth except for spiral striae on base and canal
 - 4 Spire short, shell thick and heavy *Pyrene*
 - 4 Spire as long or longer than aperture, shell small *Mitrella*
 - 3 Shell with axial and spiral sculpture *Anachis*
 - 5 Shell subcylindric, columella and canal short *Aesopus*
 - 5 Body whorl swollen, spire tapering, sharp *Strombina*
 - 5 Shell bucciniform, lip sharp or slightly thickened
 - 6 Shell with both axial and spiral sculpture *Amphissa*
 - 6 Shell with spiral sculpture only *Cosmioconcha*

Many of the western species belonging to this family were described as *Columbella* and their allocation in accordance with the modern usage of genus-names is difficult. Some of these names which have been in common use are found upon critical examination to have genotypes which differ widely from western species. *Columbella* itself is now restricted to shells which have strong spiral sculpture, and is not represented in the fauna. Similarly, the genus *Nitidella* is restricted to species which have a plicate columella; Dall's statement that the plications were obsolete in some forms is hardly sufficient to warrant placing them in the group. *Alia* and *Astyris* are found to have different genotypes from those assigned to them by Dall, and the names cannot be used in the sense in which he employed them. The genera, *Mitrella* and *Anachis* as here used might be divided, but to do so would require extensive research, the material for which is not available. Tryon, in the Manual of Conchology, used the name *Seminella* for some of the small species which we have placed in *Anachis*.

1. *Bifurcium uncinatum* (Sowerby)

Columbella uncinata SOWERBY, Proc. Zool. Soc., 1832, p. 114.—REEVE, Conch. Icon., vol. 11, 1869, pl. 23, species 142.

Columbellina uncinata (SOWERBY), TRYON, Man. Conch., vol. 5, 1883, p. 196, pl. 63, fig. 64.

Many specimens were dredged off Maria Madre Island, Tres Marias group, in about 10 fathoms.

2. *Parametaria dupontii* (Kiener)

Conus dupontii KIENER, Icon. Coq. Viv., 1850, species 6.

Meta cedonulli REEVE, Conch. Icon., vol. 11, 1859, pl. 1, species 3.

Meta dupontii (KIENER), REEVE, op. cit., species 6.

Meta philippinarum cedo-nulli REEVE, TRYON, Man. Conch., vol. 5, 1883, p. 183, pl. 60, fig. 84.

Parametaria dupontii (KIENER), DALL, Nautilus, vol. 30, 1916, p. 25.

Specimens were obtained at almost all collecting stations in the Gulf of California, and as far south as Maria Magdalena Island, Tres Marias group.

3. *Pyrene fuscata* (Sowerby)

Plate 24, figure 2

Columbella fuscata SOWERBY, Proc. Zool. Soc., 1832, p. 117.—REEVE, Conch. Icon., vol. 11, 1858, pl. 2, species 9.—TRYON, Man. Conch., vol. 5, 1883, p. 105, pl. 42, fig. 19.

Specimens were collected at nearly every point in the Gulf of California visited by the Academy's expeditions.

4. *Pyrene major* (Sowerby)

Columbella major SOWERBY, Proc. Zool. Soc., 1832, p. 119.—CARPENTER, Maz. Cat., 1857, p. 489.—REEVE, Conch. Icon., vol. 11, 1858, pl. 2, species 7.—TRYON, Man. Conch., vol. 5, 1883, p. 104, pl. 42, figs. 7, 8.

Specimens from the Tres Marias Islands are placed in this species with some hesitation. Carpenter separated it from *P. strombiformis* Lamarck, principally by the sculpture on the epidermis. It will take many more specimens than are available in the Academy's collection to determine its standing as a species or variety.

5. *Pyrene strombiformis* (Lamarck)

Plate 24, figure 1

Columbella strombiformis LAMARCK, Anim. s. Vert., vol. 7, 1822, p. 293.—CARPENTER, Maz. Cat., 1857, p. 490.—REEVE, Conch. Icon., vol. 11, 1858, pl. 2, species 8.—TRYON, Man. Conch., vol. 5, 1883, p. 104, pl. 42, fig. 5.

Specimens were collected at Mulege, salt works on Carmen Island, Punta Arena, and Ceralvo Island.

6. *Mitrella millepunctata* (Carpenter)

Plate 24, figure 9

?*Nitidella millepunctata* CARPENTER, Ann. & Mag. Nat. Hist., ser. 3, vol. 14, 1864, p. 47.—TRYON, Man. Conch., vol. 5, 1883, p. 115.

One specimen of this hitherto unfigured species was collected at Puerto Escondido, and several at San Evaristo Bay.

7. *Mitrella ocellata* (Gmelin)

Plate 24, figure 3

Voluta ocellata GMELIN, Syst. Nat., ed. 13, vol. 8, 1791, p. 3455.

Buccinum cribrarium LAMARCK, Anim. s. Vert., vol. 7, 1822, p. 274.—(?) QUOY & GAIMARD, Voy. *Astrolabe*, Zool., vol. 2, 1832, p. 421, pl. 30, figs. 21, 22. ". . . l' Ile de l' Ascension."

Nitidella cribraria LAMARCK, CARPENTER, Maz. Cat., 1857, p. 487.

Columbella cribraria LAMARCK, REEVE, Conch. Icon., vol. 11, 1858, pl. 13, species 62.

Mitrella cribraria LAMARCK, TRYON, Man. Conch., vol. 5, 1883, p. 122, pl. 48, figs. 73, 74, 75.

In this case we have followed the recent practice of considering that the species which occurs in the West Indies is the same as that found in the Gulf of California. Specimens were collected at nearly every point in the Gulf of California visited by the Academy expeditions.

8. *Mitrella dorma* Baker, Hanna & Strong, new species

Plate 24, figure 6

Shell small, strombiform, with a sharp, pointed spire, whorls seven, rounded, with distinct, impressed suture, smooth, except for nearly vertical, uneven, fine growth lines and microscopic spiral striations and, on the lower part of the body whorl and canal, about ten fine spiral grooves; color bright chestnut, with a very faint, microscopic net work of lighter lines; aperture small, rather narrow; outer lip drawn forward in the middle, thickened within, with six faint plications; columella nearly straight, obliquely truncated anteriorly, bearing six spirally elongated denticles of which the lower three are much the stronger, bordered by a raised edge; body with a thin wash of enamel; canal short, deeply notched, slightly recurved. The type is one of 110 specimens from Angeles Bay on the Gulf coast of Lower California and measures: length of shell, 6 mm.; of last whorl, 4 mm.; maximum diameter, 3 mm.

Holotype: No. 5817 Calif. Acad. Sci. Paleo. Type Coll., from **Angeles Bay, Lower California (Gulf Coast)**; collected by Fred Baker in 1921. Specimens were also collected at Smith, Granite and San Jose Islands.

In shape this species is very similar to some specimens of *Mitrella carinata californiana* Gaskoin, but it is a smaller shell, and lacks the varied color pattern present in that species. *Mitrella millepunctata* Carpenter is about the same size, but it is a more slender and lighter colored shell with a regular pattern of brown dots.

9. *Anachis bartschi* Dall

Plate 24, figure 11

Anachis bartschi DALL, Proc. U. S. Nat. Mus., vol. 54, 1918, p. 233.

Two immature specimens from San Marcos Island seem to belong to this hitherto unfigured species.

10. *Anachis coronata* (Sowerby)

Plate 24, figure 5

Columbella coronata SOWERBY, Proc. Zool. Soc., 1832, p. 114.—REEVE, Conch. Icon., vol. 11, 1858, pl. 6, species 29.

Anachis coronata SOWERBY, CARPENTER, Maz. Cat., 1857, p. 508.—TRYON, Man. Conch., vol. 5, 1883, p. 153, pl. 54, figs. 36, 37.

This species was collected at La Paz, Agua Verde Bay, San Jose Island, San Luis Gonzaga Bay, Isla Partida, San Luis Island, Puerto Escondido and Patos Island.

11. *Anachis incerta* (Stearns)

Nitidella incerta STEARNS, Nautilus, vol. 6, 1892, p. 88; Proc. U. S. Nat. Mus., vol. 16, 1893, p. 390, pl. 51, fig. 6

One adult and several young specimens were dredged at Maria Madre Island, Tres Marias group. The strength of the "close set, rounded, longitudinal ribs" and color pattern is very variable. It would have been difficult to identify the species from the description of Stearns' type from the Galapagos Islands, but a large series in the Lowe collection contains specimens agreeing exactly with the spirally banded type and with the delicately mottled Maria Madre specimens.

12. *Anachis milium* (Dall)

C. [olumbella] milium DALL, Nautilus, vol. 30, 1916, p. 26.

Columbella parva SOWERBY, Proc. Zool. Soc., 1844, p. 52. (Not "*Buccinum*" *parvum* LEA, 1841.)—REEVE, Conch. Icon., vol. 11, 1858, pl. 20, species 113.

Seminella parva (SOWERBY), TRYON, Man. Conch., vol. 5, 1883, p. 168, pl. 57, figs. 3, 4.

A single specimen was collected at the salt works on Carmen Island.

13. *Anachis pygmæa* (Sowerby)

Columbella pygmæa SOWERBY, Proc. Zool. Soc., 1832, p. 119.—REEVE, Conch. Icon., vol. 11, 1858, pl. 22, species 128.

Anachis pygmæa (SOWERBY), CARPENTER, Maz. Cat., 1857, p. 510.

Seminella pygmæa (SOWERBY), TRYON, Man. Conch., vol. 5, 1883, p. 166, pl. 56, figs. 91, 92.

Two specimens were collected at La Paz, and about 20 at Maria Madre Island, Tres Marias group.

14. *Anachis spadicea* (Philippi)

Columbella spadicea PHILIPPI, Zeit. für Mal., 1846, p. 54.—REEVE, Conch. Icon., vol. 11, 1858, pl. 21, species 123.

Seminella spadicea (PHILIPPI), TRYON, Man. Conch., vol. 5, 1883, p. 168, pl. 57, fig. 6.

Six specimens were collected at Isla Danzante in the Gulf of California.

15. *Anachis subturrita* Carpenter

Anachis subturrita CARPENTER, Proc. Calif. Acad. Sci., vol. 3, 1866, p. 223.—OLDROYD, Stanford Univ. Publ., Geol. Sci., vol. 2, pt. 1, 1927, p. 270.

Seminella subturrita (CARPENTER), TRYON, Man. Conch., vol. 5, 1883, p. 178, pl. 58, fig. 47

Anachis petravis, DALL, Proc. U. S. Nat. Mus., vol. 34, 1908, p. 250.

Ten specimens dredged at Maria Madre Island, Tres Marias group, seem to be identical with the California species.

16. *Anachis tincta* Carpenter

Plate 24, figure 8

? *Anachis tincta* CARPENTER, Ann. & Mag. Nat. Hist., vol. 14, 1864, p. 49.

Seminella tincta (CARPENTER), TRYON, Man. Conch., vol. 5, 1883, p. 178.

Several specimens from Cape San Lucas, the type locality, seem to agree with the description of this minute species, hitherto unfigured.

17. *Anachis vexillum* (Reeve)

Columbella vexillum REEVE, Conch. Icon., vol. 11, 1858, pl. 12, species 57.

Anachis vexillum REEVE, TRYON, Man. Conch., vol. 5, 1883, p. 119, pl. 47, fig. 54.

A single specimen was collected at Georges Island. This seems to be a valid and easily recognizable species.

18. *Anachis treva* Baker, Hanna & Strong, new species

Plate 24, figure 4

Shell ovate, shining, flesh colored, with a spiral band of irregular, and irregularly spaced chestnut spots on the periphery, a second row of smaller dots on the base, and a narrow band of fine, axial, chestnut lines next to the suture; nucleus small, blunt, of about two smooth whorls; subsequent whorls six, well rounded; sutures distinct; sculpture of nine or ten low, rounded, nearly vertical axial ribs which are very faint on the upper whorls, but gradually grow stronger toward the aperture; base and canal with fine, closely spaced, spiral grooves, which cross both ribs and interspaces; aperture small, in the adult with a varicose rib just back of the edge of the outer lip, and eight strong denticles on the inside; columella short, straight, obliquely truncate anteriorly with a raised margin and three obscure denticles; body covered with a thin wash of enamel; canal short, deeply notched, hardly recurved. The type is one of more than one hundred, mostly immature, specimens dredged off Maria Madre Island, Tres Marias group and measures: length of shell 9.5 mm.; of last whorl, 7 mm.; maximum diameter, 4.5 mm.

Holotype: No. 5820, Calif. Acad. Sci. Paleo. Type Coll., from **Maria Madre Island, Tres Marias group, Mexico.**

In color and general shape this species resembles *Columbella varia* Sowerby,² found along the west coast from Panama north to the Gulf of California, but that is a larger and more strongly marked form. Neither species should be confused with *Columbella varians* Sowerby,³ which was described from the Galapagos Islands, but is possibly confined to Hawaii and other localities far to the westward.

19. *Strombina gibberula* (Sowerby)

Columbella gibberula SOWERBY, Proc. Zool. Soc., 1832, p. 115.—REEVE, Conch. Icon., vol. 11, 1858, pl. 13, species 61.

Strombina gibberula (SOWERBY), TRYON, Man. Conch., vol. 5, 1883, p. 184, pl. 60, fig. 90.

This species was collected at Puerto Escondido, San Jose Island, Las Animas Bay, Cape San Lucas and dredged in large numbers off Maria Madre Island, Tres Marias group.

20. *Strombina maculosa* (Sowerby)

Columbella maculosa SOWERBY, Proc. Zool. Soc., 1832, p. 116.—REEVE, Conch. Icon., vol. 11, 1858, pl. 4, species 19.

Strombina maculosa (SOWERBY), CARPENTER, Maz. Cat., 1857, p. 513.—TRYON, Man. Conch., vol. 5, 1883, p. 186, pl. 60, fig. 97.

This species was collected at Puerto Escondido, San Evaristo Bay, San Francisquito Bay and at Maria Madre Island, Tres Marias group.

² Sowerby, G. B. Proc. Zool. Soc. London, 1832, p. 116.

³ Sowerby, G. B. Proc. Zool. Soc. London, 1832, p. 118.

21. *Strombina pulcherrima* (Sowerby)

Columbella pulcherrima SOWERBY, Proc. Zool. Soc., 1832, p. 113.—REEVE, Conch. Icon., vol. 11, 1858, pl. 3, species 10.

Strombina pulcherrima (SOWERBY), TRYON, Man. Conch., vol. 5, 1883, p. 185, pl. 60, fig. 96.

Three specimens of this species were dredged off Maria Madre Island, Tres Marias group.

22. *Aesopus eurytoides* (Carpenter)

Plate 24, figure 10

Truncaria eurytoides CARPENTER, Ann. & Mag. Nat. Hist., vol. 14, 1864, p. 47.

Aesopus arestus DALL, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 332.

Aesopus eurytoides (CARPENTER), OLDROYD, Stanford Univ. Publ., Geol. Sci., vol. 2, pt. 1, 1927, p. 278.

A large series from Cape San Lucas, the type locality, shows considerable variation in color and strength of axial ribs. In the lot there are specimens which agree in every way with the description of *arestus* which came from Magdalena Bay.

23. *Aesopus sanctus* Dall

Plate 24, figure 7

Aesopus sanctus DALL, Proc. Biol. Soc. Wash., vol. 32, 1919, p. 250.—OLDROYD, Stanford Univ. Publ., Geol. Sci., vol. 2, pt. 1, 1927, p. 279.

Eight specimens from Cape San Lucas seem to be identical with the California species.

24. *Amphissa lyrta* Baker, Hanna & Strong, new species

Plate 15, figure 1 (See Vol. XXIII, No. 14)

Shell small, bucciniform, with a smooth nucleus of one whorl and six subsequent, roundly shouldered, sculptured whorls; color yellowish-brown, with a darker, brownish band on the periphery of the whorls; spiral sculpture of close-spaced, low, rounded cords, of which six appear between the sutures and ten on the base and canal; axial sculpture of equally close-spaced low, somewhat undulated, very slightly protractive ribs; the intersection of the cords and ribs forming rounded tubercles becoming obsolete on the base; aperture oval; outer lip thin, sharp-edged, showing the sculpture within; columella short, nearly straight, obliquely truncate anteriorly; body with a very thin wash of enamel which scarcely obscures the sculpture; canal short, straight; operculum small, thin, yellowish. The type is one of ten specimens from the Isla Partida in the Gulf of California and measures: length of shell, 9 mm.; of last whorl, 6 mm.; maximum diameter, 4 mm.

Holotype: No. 5816, Calif. Acad. Sci., Paleo. Type Coll., from **Isla Partida, Gulf of California**; collected by Fred Baker, 1921. Eight additional specimens were collected at Granite Island, two at San Luis Gonzaga Bay and one at Coronados Island.

This is not only the smallest of the species placed in the genus, but the most southerly in its distribution. In all the specimens examined the sculpture is very constant, but there is considerable variation in the color, some of them being nearly white, while in others the brown band is expanded to cover the upper half of the whorl.



PLATE 24

Fig. 1. *Pyrene strombiformis* (Lamarck). Plesiotype No. 5827, C. A. S. Mulege Bay, Gulf of California. Length, 26 mm.; diameter, 16.6 mm.; p. 247.

Fig. 2. *Pyrene fuscata* (Sowerby). Plesiotype No. 5824, C. A. S. Isla Partida, Gulf of California. Length, 18.2 mm.; diameter, 11.5 mm.; p. 247.

Fig. 3. *Mitrella ocellata* (Gmelin). Plesiotype No. 5819, C. A. S. Georges Island, Gulf of California. Length, 12.8 mm.; diameter, 5.0 mm.; p. 248.

Fig. 4. *Anachis treva* Baker, Hanna & Strong, n. sp. Holotype No. 5820, C. A. S. Maria Madre Island, Mexico. Length, 9.5 mm.; diameter, 4.5 mm.; p. 251.

Fig. 5. *Anachis coronata* (Sowerby). Plesiotype No. 5826, C. A. S. Pa Laz, Lower California. Length, 14.0 mm.; diameter, 6.3 mm.; p. 249.

Fig. 6. *Mitrella dorma* Baker, Hanna & Strong, n. sp. Holotype No. 5817, C. A. S. Angeles Bay, Lower California. Length, 6.0 mm.; diameter, 3 mm.; p. 248.

Fig. 7. *Aesopus sanctus* Dall. Plesiotype No. 7081, C. A. S. Cape San Lucas, Lower California. Length, 4.8 mm.; diameter, 1.6 mm.; p. 252.

Fig. 8. *Anachis tincta* Carpenter. Plesiotype No. 7079, C. A. S. Cape San Lucas, Lower California. Length, 5.8 mm.; diameter, 2.6 mm.; p. 250.

Fig. 9. *Mitrella millepunctata* (Carpenter). Plesiotype No. 7077, C. A. S. San Evaristo Bay, Lower California. Length, 6.5 mm.; diameter, 2.8 mm.; p. 248.

Fig. 10. *Aesopus eurytoides* (Carpenter). Plesiotype No. 7080, C. A. S. Cape San Lucas, Lower California. Length, 6.6 mm.; diameter, 2.3 mm.; p. 252.

Fig. 11. *Anachis bartschi* Dall. Plesiotype No. 7078, C. A. S. San Marcos Island, Gulf of California. Length, 6.4 mm.; diameter, 2.6 mm.; p. 249.